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THE INFLUENCE OF SHAME ON THE FREQUENCY OF SELF-CONTROLLED FEEDBACK AND MOTOR LEARNING

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by

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Making learners aware of their mistakes is a frequent strategy used by practitioners; the common assumption is that doing this will ultimately lead to improvements in motor behavior. However, making someone aware of their errors, especially in front of their peers, can cause the person to feel embarrassed or ashamed. The purpose of this study was to investigate the impact of induced shame on the performance of a novel motor skill. More specifically, how shame affects the frequency of self-controlled feedback and the learning of a novel motor skill. Participants (N = 80) practiced a manual tracking task on a rotary pursuit tracker. Participants were quasi-randomly assigned to one of the six experimental conditions (i.e., shame SC, shame shame-yoked, neutral shame-yoked, neutral SC, neutral neutral-yoked, and shame neutral-yoked). Participants assigned to the shame conditions were told during practice that their performance was below average, whereas participants in the neutral conditions were told that their performance was average. The results of the study indicated that shame did not have a meaningful effect on motor performance or learning. It was also concluded that the frequency of requested feedback was not significantly different between the two self-control groups (i.e., shame-SC and neutral-SC).

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CHAPTER 1

INTRODUCTION

In the realm of motor behavior, it has long been established that there are many contributing factors that are associated with enhancing motor learning and control. One of those factors is how the learner receives and processes task-relevant feedback. Feedback is a term that is associated with the delivery mechanism regarding how a learner obtains information about how they performed on a given task. Feedback can be acquired by the learner (i.e., task-intrinsic) or received from an external source (i.e., augmented). According to Magill (2010), augmented feedback is defined as, "a generic term used to describe information about performing a skill that is added to sensory feedback and comes from a source external to the person performing the skill; it is sometimes referred to as extrinsic or external feedback" (p. 333).

There are a variety of different types of feedback that can be provided to the learner (e.g., positive, negative, normative, etc.), and these different forms of feedback can affect motor learning. Also, allowing the learner to actively participate in the choosing of when to receive feedback (i.e., self-controlled practice) has been shown to improve performance (Chiviacowsky & Wulf 2002; 2005). The frequency with which a learner receives augmented feedback can play a contributing role in the learning of a motor skill as well. For the purpose of the present study, frequency will be defined as the rate at which feedback occurs over the duration of practice.

In addition to the use of augmented feedback, there are other influences that affect motor learning; ranging from specific instructions of a given task (i.e., focus of attention), to the structure of a practice schedule (i.e., contextual interference). Although there are many factors that influence the motor learning process, the primary objective of this study was to examine practice related effects specifically linked to the usage of augmented feedback.

In the past few decades, researchers have investigated various ways in which feedback received by an individual interacts with the motor learning process (Saemi, Porter, Varzaneh, Zarghami, & Maleki, 2012; Salmoni, Schmidt, & Walter 1984; Wulf, 2007). There are two general types of feedback (i.e., task-intrinsic and augmented) that can be obtained during the learning of a motor skill. Task-intrinsic feedback is the sensory-perceptual information that is a natural part of performing a skill (Magill, 2010). For example, when a basketball player shoots a free-throw they are provided sufficient naturally available task-intrinsic feedback to determine if they made or missed the shot. As mentioned above, when learners receive feedback from an external source it is referred to as augmented feedback (Magill, 2010). For example, a coach might give specific feedback to a bowler about their arm movements during the swing phase of their bowling technique. Augmented feedback is delivered as either knowledge of performance (KP) or knowledge of results (KR). KP refers to feedback in which the learner is informed of the quality or pattern of movement that led to their performance outcome. KP can be provided to the learner during or after the practicing of a motor skill. In contrast, KR refers to information that is specific to the outcome of the performance and is always provided after the task has been completed. These forms of augmented feedback can be provided to a learner from a technological source (e.g., computer, heart rate monitor, hearing aid, speedometer, etc.) or from another person (e.g., coach, teacher, therapist, personal trainer). Typically when augmented feedback is given by another person it is delivered verbally to the individual.

The content of and methods used to deliver verbal augmented feedback can affect the way an individual learns a specific task. For example, research has demonstrated that providing feedback after relatively good trials, as compared to poor trials, enhances motor skill learning (Badami, VaezMousavi, Wulf, & Namazizadeh, 2011; Chiviacowsky & Wulf, 2007; Wulf, Chiviacowsky, & Lewthwaite, 2010). In a recent study conducted by Wulf, Chiviacowsky, and Lewthwaite (2010), participants learned a sequential timing task. Individuals were placed into one of two groups. Both groups received bogus normative feedback in which they were compared to an average performance of a fictitious peer group. One group of participants was given false positive feedback in which their scores were portrayed as improvement, while the other group of participants were given false negative feedback in which their performance seemed to decrease relative to the fictitious peer group. Both groups received feedback after each block of 10 trials for a total of 80 trials. A 24-hour retention and transfer test was conducted in which no feedback was given. Results showed the "better" group outperformed the "worse" group on both the retention and transfer tests indicating enhanced learning effects. These findings suggest that providing positive oriented augmented feedback to a learner during practice has a more meaningful effect on motor learning compared to providing learners with negative oriented augmented feedback.

A related study that was conducted by Saemi et al. (2012) looked at self-efficacy and motor learning in individuals by giving KR augmented feedback after relatively good trials or relatively poor trials. What they found was that providing augmented feedback related to good performances increased a learner's self-efficacy and enhanced performance and motor learning, as compared to equally skilled participants that received augmented feedback about poor performances. These findings suggest that learners see a greater improvement in motor learning when they are given augmented feedback after good performance trials as compared to relatively poor performance trials. Furthermore, as they are aware of their good performance, their perceived ability in the given task is also enhanced. When feedback was given after poor trials, learners' perceived ability of the task decreased.

Not only does feedback after poor trials decrease self-efficacy, but it also increases the sensation of shame (Thompson, Altmann, & Davidson, 2004). Nathanson (1992) defines shame as a highly self-conscious and negative emotion that is triggered by perceived devaluation. Thompson et al., examined shame and its effects on self-efficacy and anxiety by intentionally giving negative feedback to a learner after failing in a discrimination task. When learners received negative feedback on their performance, they were told that the task was very simple and easy and that it was one that most individuals could complete successfully. Learners perceived they were below average and shame was induced. Through analyzing anxiety and self-efficacy inventories, the researchers concluded that inducing shame decreased self-efficacy and increased anxiety (2004).

This is an important consideration to contemplate, because the method that is used to deliver performance related information to learners is critically important in the facilitation of motor learning, and the information that is provided to learners has a direct impact on their own perception of their motor ability. Furthermore, as discussed earlier, allowing the learner to participate (i.e., self-control) in the process of when to receive augmented feedback is also highly influential in the motor learning process. According to Kaefer, Chiviacowsky, Meira, and Tani (2014), "Self-controlled practice, in general, is a situation in which learners have possibilities of participating more actively in the process of learning, as they have the freedom to make decisions about some of its aspects" (p. 226). Janelle, Kim, and Singer (1995), were the first to explore SC feedback and its effects on motor learning. In that study, volunteers participated in a ball-throwing task using their non-dominant arm. Each individual in the self-control group had the ability to request augmented feedback whereas their 'yoked' counterpart only received feedback when the self-control group requested it. The findings of that initial study demonstrated that the self-control group showed a greater increase in learning of the movement form compared to the yoked participants. The self-control group also scored about 15% higher than the yoked group on the retention test. In addition, they increased their throwing accuracy with their non-dominant arm by the end of the study. Since that initial demonstration of the benefits of using self-controlled augmented feedback, there have been numerous studies demonstrating the effectiveness of this practice strategy.

Building on the earlier works of Janelle et al. (1995), Chiviacowsky and Wulf (2005) were the first to propose a theoretical explanation for this phenomenon. Using a sequential timing task, two groups had the ability to request feedback when they wanted it. However, one group had to decide if they wanted feedback before trials were completed (i.e., self-before), while the other group was able to request feedback after the trial was completed (i.e., self-after). The results indicated that the self-after group had an overall lower error score compared to the self-before group on the transfer test. This study suggests a self-controlled practice schedule enhances performance primarily due to the learner's needs of the task. Furthermore, it supports the idea that motor learning is enhanced when the learner has the ability to estimate their performance and make a decision about receiving feedback after a trial.

While it is well documented that giving the learner the ability to choose when to receive augmented feedback enhances motor learning, the frequency of feedback the learner receives can either be beneficial or detrimental to learning as well (Salmoni et al., 1984; Wulf & Shea, 2004). When feedback is given too frequently, learners can develop a dependency on the feedback (Salmoni et al., 1984). This dependency can elicit a negative effect on learning according to the guidance hypothesis (Salmoni et al., 1984). According to Wulf and Shea (2004), the guidance hypothesis, "received its name from the role feedback was thought to play in guiding the performer to the correct movement during the learning process" (p. 6). When learners receive augmented feedback after every trial (i.e., 100%), they essentially use it to "guide" them into performing the task successfully. Although providing a high frequency (i.e., 100%) of augmented feedback may seem beneficial during practice, it actually has the opposite effect during a testing environment, resulting in depressed learning effects.

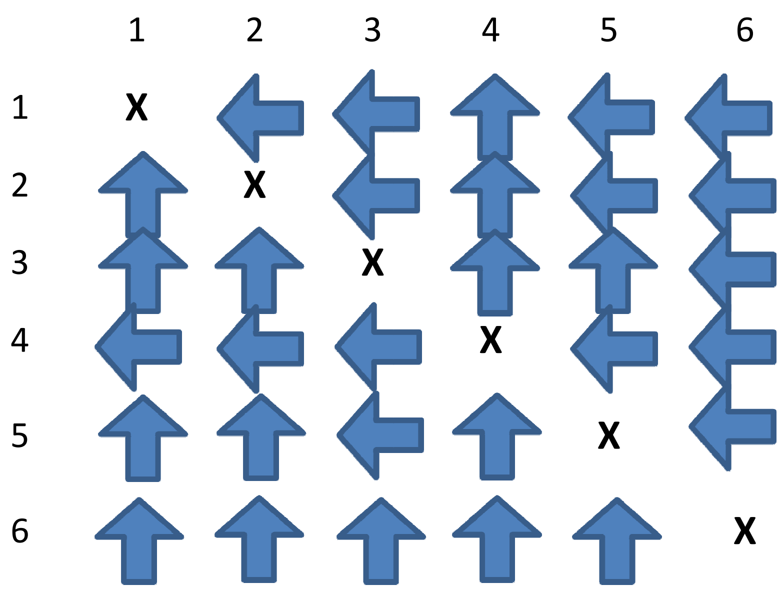
Before Salmoni et al. (1984) proposed the guidance hypothesis, it was generally accepted that providing an absolute frequency (i.e., 100%) was better than providing a reduced amount of augmented feedback. However, initial findings presented by Winstein and Schmidt (1990) suggested otherwise. In their study, some participants received feedback after every trial while others received augmented feedback at a reduced frequency. The authors found that providing participants with a high frequency of augmented feedback during practice resulted in superior practice performance, but worse post-test performance compared to participants that practiced the same task while receiving less augmented feedback. These findings revealed that a dependence on KR cannot fully account for the detrimental effects of frequent KR on learning. "Consistent with the predictions of the guidance hypothesis, Winstein and Schmidt suggested that lower relative frequencies might enhance learning because no-KR trials may cause the participant to engage in additional important cognitive processes such as those related to error detection and correction that may be bypassed when KR is presented" (Wulf & Shea, 2004, p. 8). These studies suggest that there are unmeasured cognitive mechanisms operating that impede the learning process of a motor skill when 100% feedback is given. The findings show that providing less augmented feedback during practice will enhance learning, while providing too much augmented feedback depresses learning.

It is well established that motor learning is enhanced when the learner is able to choose when they would like to receive feedback (Janelle et al., 1995; Chiviacowsky & Wulf, 2002; Chiviacowsky and Wulf, 2007). Additionally, how frequent feedback is given during practice plays a contributing role in the learning process (Salmoni et al., 1984; Wulf & Shea, 2004). Furthermore, the way in which augmented feedback is given can influence self-efficacy and performance (Saemi et al., 2012; Chiviacowsky & Wulf, 2002; Chiviacowsky & Wulf, 2007). If augmented feedback induces shame on an individual, self-efficacy is decreased and anxiety increases (Thompson et al., 2004). To date, shame and its influence on the self-control strategies of requesting augmented feedback and the influence this process has on motor performance and learning have yet to be investigated.

The lack of research in this area leads to many unanswered questions. If shame reduces self-efficacy, would that lead to a decrease in the frequency of requested feedback? If so, would that increase performance or would shame decrease performance? Which of the two has the greatest effect on motor learning? These questions led to two purposes that were the impetus for the present study. The first purpose of the study was to determine if shame inducing augmented feedback compared to neutral augmented feedback influenced the frequency in which participants requested feedback. We hypothesize that the shame self-control (SC) group would have a lower frequency of self-controlled feedback compared to a group that received neutral augmented feedback.

The second purpose of this study was to determine how the frequency of requested augmented feedback and the type of feedback (i.e., shame and neutral) influenced the performance and learning of a novel motor skill. There were a wide range of hypotheses that were tested in the present study. Figure 1 shows a matrix of predictions that were made regarding the various experimental conditions. The numbers in the below matrix corresponds to a specific experimental condition listed in the legend. The direction in which the arrow is pointing indicates which group was predicted to perform the best during post-test measures. Please refer to the procedures section for a more in-depth description of each experimental condition.

Hypotheses matrix



Legend
(1) Shame SC
(2) Neutral shame-yoked
(3) Shame shame-yoked
(4) Neutral SC
(5) Neutral neutral-yoked
(6) Shame neutral-yoked

Figure 1. Matrix. Arrow pointing to group that will outperform the other.

CHAPTER 2

METHOD

Participants

Participants included undergraduate male students (*N* = 80) at Southern Illinois University Carbondale. Only male participants were tested to eliminate any potential shame elicited gender effects. Participants had no prior experience with the practiced task and all were naive to the purposes of the experiment. All participants signed an informed consent before participating in the study. All methods and forms were approved by the University's Human Subjects Committee.

Apparatus and Task

Participants practiced a manual tracking task on a rotary pursuit tracker (model #30014C, Lafayette Instruments, Laffayette Indiana, USA). The apparatus was 48.26 centimeters (cm) in length, 35.56 cm in width, and 15.24 cm in height. The tracking platform of the apparatus was 33.02 cm in length and width. The tracking platform was interchangeable and could be replaced with different shapes (e.g., square, circle, triangle). Only the circle template was used for the study. The circle template was 30.48 cm in diameter. It contained a 1.9 cm diameter clear glass font with the remaining platform darkened and impenetrable to light. Please refer to Figure 2 for a visual representation of the apparatus.

Figure 2. Rotary pursuit tracking device in use.

When the task began, a 2-cm x 2-cm light source illuminated through the clear part of the glass top and rotated in a circular clockwise pattern at 80 revolutions per minute. The goal for the participant when performing the rotary pursuit tracking task was to keep the tip of a handheld stylus that contained a light-sensitive photocell in contact with the rotating light throughout the duration of the trial. The total time the tip of the handheld stylus was in contact with the rotating light served as the dependent measure of the study.

Procedures

Participants were quasi-randomly assigned to one of the six experimental conditions (i.e., shame SC, shame shame-yoked, neutral shame-yoked, neutral SC, neutral neutral-yoked, and shame neutral-yoked). The ordering of the words in each experimental group indicates the specific type of prescribed feedback they received. Specifically, the first word in the group name indicates the type of feedback that group received (i.e., shame or neutral). The second word indicates which self-control group they were yoked with, and the third word (if present) identifies that it was a yoked group. Descriptions of each experimental condition are as follows. In the shame SC condition (*n* = 15), participants had the ability to request feedback after any given trial. When feedback was requested the participant was provided false negative feedback regarding their performance in comparison to false non-existent norms (e.g., they were told their performance was below average for males in their age group). The shame shame-yoked condition (n = 15) did not have the ability to request feedback, rather, they were given the same frequency of feedback as their yoked participant in the shame SC condition. The shame shame-yoked condition was also provided the same false feedback that was given to their SC counterpart. The neutral shame-yoked (n = 15) condition did not have the ability to request feedback, but was given the same frequency of feedback as their yoked counterpart in the shame SC condition, however the neutral shame-yoked participant was told that their performance was average compared to male college students (i.e., a false normative group). The neutral SC condition (n = 15) had the ability to request feedback and was provided neutral feedback regarding their performance. When feedback was requested they were compared to a false normative group, but were told their performance was average. The neutral neutral-yoked (n = 15) and shame neutral-yoked (n = 15) conditions were both given identical frequencies of feedback as their yoked counterpart in the neutral SC condition, but the participant in the neutral neutral-yoked condition was given false neutral feedback, whereas the participant in the shame neutral-yoked condition was given false negative feedback.

Participants were tested together in pairs of two, and were covertly assigned to different experimental groups. Specifically, one of the two participants was randomly placed in the shame feedback condition and the other in the neutral feedback condition. Before testing began, all participants were given a set of general instructions which included the objective of the task and their ability (i.e., self-controlled conditions) or inability (i.e., yoked conditions) to request feedback after trials. Both participants completed a total of 50 practice trials. The duration of each trial was 5 seconds. After each participant completed a set of 5 trials they sat and watched the other participant perform a set of 5 trials. The participants were separated by a distance of approximately 1 meter. As a result of this close proximity, both participants were able to hear the augmented feedback (e.g., shame inducing or neutral) when it was provided. Practice continued until both participants finished their prescribed 50 practice trials. Depending on when feedback was given, participants were shamed or given neutral feedback throughout the duration of practice. It is worth emphasizing that both participants were able to hear all the augmented feedback that was provided, meaning that when one of the participants was provided shame-inducing augmented feedback, the other participant was clearly able to hear that person being told that they were performing “below average.” This method was utilized with the explicit intent of inducing shame in the participant. This made it clearly apparent that one participant in the pair was “average” while the other was “below average.” It is also important to note that the "below average" feedback was intended to be shameful because the shame-induced participant was verbally told their performance was below the average norm of individuals in their demographic, and more specifically worse than their peer.

All participants returned the following day, individually, for two post-tests. The post-tests consisted of a 10-trial retention test with the rotary pursuit task set with the same shape (i.e., circle), speed (i.e., 80 revolutions per minute), and direction (i.e., clockwise) that were practiced during the prior day. Participants also completed a 10-trial transfer test with the rotary pursuit task set with the same circular shape, but the speed was set at 60 revolutions per minute, and the rotating light moved in an opposite (i.e., counterclockwise) direction. Following the completion of the retention and transfer tests, participants were debriefed as to the true nature of the study and thanked for their participation.

CHAPTER 3

RESULTS

Practice

Practice data were analyzed using a 6 (condition) x 10 (trial block) analysis of variance (ANOVA) with repeated measure on the second factor. There was a significant main effect for Trial Block $F(9, 837) = 35.46$, $p < 0.001$. Post-hoc testing (LSD) indicated that the time on target for all six conditions improved throughout the practice trials. The ANOVA further revealed that there was not a significant main effect for condition $F(5,93) = 1.39$, $p = 0.236$, and the interaction between condition and trail block was not significant $F(9,45) = .883$, $p = .692$. The practice performances for each condition are displayed below in Figure 3.

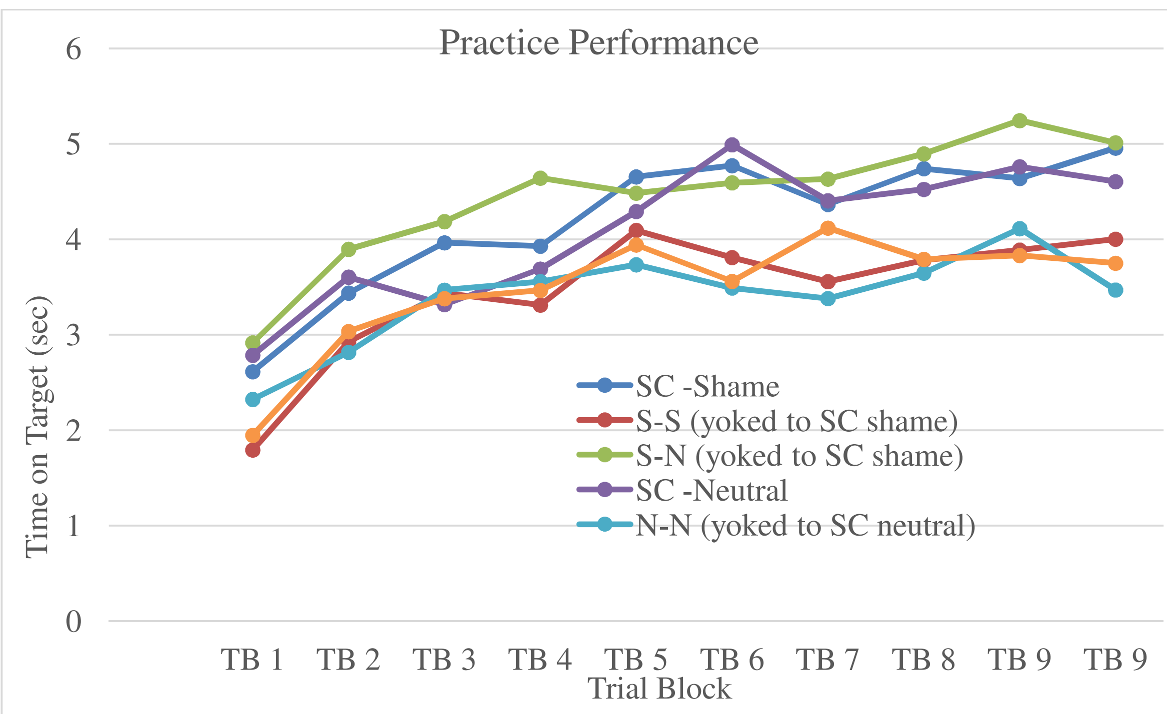


Figure 3. Practice performance for all six conditions. Time on target (seconds).

Post-Test

Retention and transfer test scores were analyzed using separate univariate ANOVAs. These analyses indicated that there were no significant differences between the groups on the retention ($F(5, 99)$ 0.519, $p = 0.761$) or transfer test ($F(5, 99)$ 0.384, $p = 0.858$).

Frequency of Feedback

Frequency of feedback was analyzed using a univariate ANOVA. Similar to the post-test measures, there were no significant differences between the two self-regulated groups in the frequency in which they requested augmented feedback ($F(1, 35)$ 0.191, $P = 0.665$).

CHAPTER 4

DISCUSSION

The present study had two distinct aims. The first was to investigate how shame inducing feedback and neutral feedback influenced the frequency of learner requested augmented feedback. It was hypothesized that participants in the shame SC group would request a reduced amount of augmented feedback compared to participants in the neutral SC group. The second purpose of the study was to examine how the frequency and type of prescribed augmented feedback (i.e., shame or neutral) influenced the performance and learning of a novel motor skill. Figure 1 displays the predicted outcomes between the comparisons of all six experimental groups. In short, the results of the present study did not support any of the experimental hypotheses. The results of the acquisition data indicated that the motor performance of all six experimental conditions improved during the practice phase of the experiment. However, there were no significant differences in practice or post-test measures between the six conditions, suggesting that all practice conditions resulted in similar motor learning effects.

Shame did not appear to have a meaningful effect on practice performance. Previous research suggests that providing false negative normative feedback hindered motor learning and performance as compared to providing false positive or false neutral normative feedback during practice (Chiviacowsky & Wulf, 2007; Wulf et al., 2010). Furthermore, Saemi et al. (2012) found that giving KR augmented feedback after relatively poor trials, versus good trials, resulted in a decrease in practice performance and post-test measures. The findings of the present study are not consistent with the conclusions reported by Chiviacowsky and Wulf (2007), Saemi et al. (2012), or Wulf et al., (2010). Specifically, practice trials for all shame groups remained relatively similar compared to the neutral feedback groups.

One possible explanation as to why the findings reported here are not consistent with previous research lies within the subtleties of how the methodology that was utilized within the current study differed from previous works. The methodology used in the present study differs from previous research in that participants came in for testing with a partner, not individually. One participant was randomly assigned to a shame condition and the other was assigned to a neutral condition. As a result, the shame that was prescribed to the shame condition participant could have possibly had an effect, or 'transferred,' to the individual in the neutral group. Research has shown that social group-based emotions can have an influence on an individual's shame and guilt within the group (Lickel, Steele, & Schmader, 2011). More specifically, if a group of individuals associate themselves as a team rather than individuals, and an individual is shamed within the group, the entire group can experience the effect of the induced shame due to the unity of that group. If this were the case, the shame that was prescribed to the participant in the shame condition may have also had an effect, positively or negatively, on motor performance and learning on the participant in the room that was not actively being shamed. If this were the case, then it provides a plausible explanation for why there were no observed differences between the shame and no-shame conditions. In effect, all of the participants were shamed either directly or indirectly, resulting in no net differences between any of the experimental conditions.

Providing a learner with neutral normative feedback also appears to have had no effect on practice performance compared to directly shaming an individual. It was hypothesized that participants receiving neutral feedback during practice would outperform participants that were provided shame-inducing feedback at the same frequency. Previous research suggests neutral normative feedback enhances practice performance when individuals are being compared to social norms (Bandura & Jourden, 1991). However, the findings of the present study do not support this conclusion. A potential reason for this result could be that participants in the current study used the neutral feedback that was given to them verbally and compared themselves to their peer that was actively being shamed. This possibility suggests participants were comparing themselves to each other, rather than to the false social norms that were used during the study. As a result, the false norms would have had no influence on the motor performance or learning, which has been observed in previous studies that tested participants individually (Chiviacowsky & Wulf, 2007; Wulf et al., 2010).

The frequency of requested feedback was not significantly different between the two groups (i.e., shame-SC and neutral-SC) that were allowed to freely choose when they wanted augmented feedback from the researcher. Initially, these findings would seem to suggest that frequency of feedback is not a contributing factor to the results of the study. However, due to the methodology of the current study, having a peer present during testing may have affected the frequency of requested feedback. As stated previously, Lickel et al. (2011), suggests that shame and guilt can be quite painful at a group level. When a group feels threatened by shame being induced to the group, or an individual within the group, the group will find ways to divert or cope with the shame. To expand on this idea, the neutral-SC participant in the group may have chosen to request less feedback because he did not want the shame-SC participant in the group to feel more ashamed than they already were. If this were the case, then the overall frequency of requested feedback would likely be similar between the two groups. Which is what was observed in the current study.

Furthermore, it does not appear that giving learners the choice to request feedback in this study provided them any benefit compared to the various yoked conditions. The data suggest that there were no significant differences between the shame-SC and its yoked counterparts, and the neutral-SC and its yoked counterparts. This study differs from the extensive amount of research that supports the hypothesis that having self-control of feedback results in superior motor learning compared to not having the ability to choose when to receive feedback (Chiviacowsky & Wulf, 2007; Wulf, 2007; Wulf et al., 2010). A potential explanation for this inconsistent finding could be because shame may have had an offsetting effect on self-control, which would suggest that shaming an individual may have a more meaningful effect on motor learning than allowing the learner to choose when to request augmented feedback. Therefore, if shame did in fact have an effect on performance, but was unseen due to its 'transferring' effect on the neutral group, it could have had a more meaningful effect on practice performance that would have nullified the potential benefits of SC feedback. In other words, the negative effects of shame may have offset the positive attributes of self-controlled practice, explaining the lack of significant differences between the self-control groups and yoked groups.

Not only were there no significant differences during practice, but the data very clearly suggest that there were no differences on learning effects either. Shaming an individual during practice did not have a meaningful effect (compared to receiving neutral feedback) on retention or transfer measures. Previous research has shown that having the choice of when to receive feedback enhances learning (Chiviacowsky & Wulf, 2007; Wulf et al., 2010). This study contradicts the observations reported in earlier literature. As stated previously, it is proposed that some internal mechanism overpowered the effects of self-controlled feedback in the current experiment. It appears that shame could be the underlying variable in this case because if, in fact, shame did transfer from the shame-feedback participant to the neutral–feedback participant, it would negate any potential positive effects that self-control would have by the negative effects of shame.

However, because learning was not enhanced in the neutral conditions relative to the shame conditions, it still leaves a few unanswered questions. Due to the methodological differences in the present study, compared to past research, the interaction between two individuals as one is being shamed and the other receiving neutral feedback is still unknown. It becomes difficult to determine if individuals in the neutral conditions were comparing themselves to the false social norm or to his shamed peer. It was assumed that the participants would compare themselves to the social norms that were depicted in the prescribed augmented feedback, rather than comparing themselves to the peer that was being concurrently tested. As a result, an individual within a group may deem themselves good at the given task, so long as they outperformed their shamed peer regardless of how they compared to a social norm. This is an inherent limitation to the current study. Future studies should isolate these individual conditions to ensure that no cross-effects occur. Isolating each condition may more precisely determine the effects of shame on practice performance and motor learning. However, testing participants in isolation will likely reduce the effects of the shame inducing feedback as there is not a present peer to cause the shamed participant to feel ashamed.

Furthermore, future studies should look at shaming individuals in front of different audience settings (e.g., video camera, larger crowd of individuals, opposite gender, etc.). The present study only observed shame in front of one other male individual besides the researcher, who was also male. This is a noteworthy consideration because it is not presently known if gender is a mitigating factor in shame effects on motor learning or performance. Future research should also test different amounts of induced shame. Perhaps shaming an individual after every practice trial, rather than allowing them to choose when to receive shame-inducing feedback, may have a greater effect on motor behavior. It should also be noted that the experience of shame within the individual was not directly measured. Due to this, it remains unknown if individuals actually felt shamed throughout the present study. Future direction should directly measure the magnitude of shame. Furthermore, testing the acquisition of various skills that have real-world relevance may be more directly applicable for practitioners.

In conclusion, the data suggest that inducing shame had no effect on the frequency of requesting augmented feedback, nor did shaming individuals during practice effect practice performance or motor learning relative to learners that received neutral feedback at the same rate. If induced shame has no effect on the frequency of self-control feedback, practice performance, or learning, it still becomes significantly important. Specifically, it probes the question that if shame does not affect motor learning or performance, then is there any value in shaming individuals during practice? Based on the results of this experiment, there do not seem to be any potential theoretical or practical benefits or detriments in shaming an individual within a motor behavior context.

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